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⑤④ **Method and apparatus for dividing a package removed from a bird, comprising intestines, liver and heart with lungs, in separate parts.**

⑤⑦ The invention provides a method and apparatus for dividing a package removed from a bird, comprising intestines (4), liver (5) and heart with lungs (6), in separate parts. Using said method and apparatus firstly the heart-lungs (6) assembly is cut loose from the package, whereafter the intestines (4) and liver (5) are separated. For cutting loose the heart-lungs assembly a cutting means (7,26) positioned

alongside a conveyor (1,22) for the package may be applied, whereas the separation of the intestines and liver may be carried out through a separating means (12,27) cooperating with the conveyor. As conveyor a rotating disc (1) with reception slots (3) for packages may be considered; a chain conveyor (22) comprising carriers (23) with reception slots (24,25) is possible too.

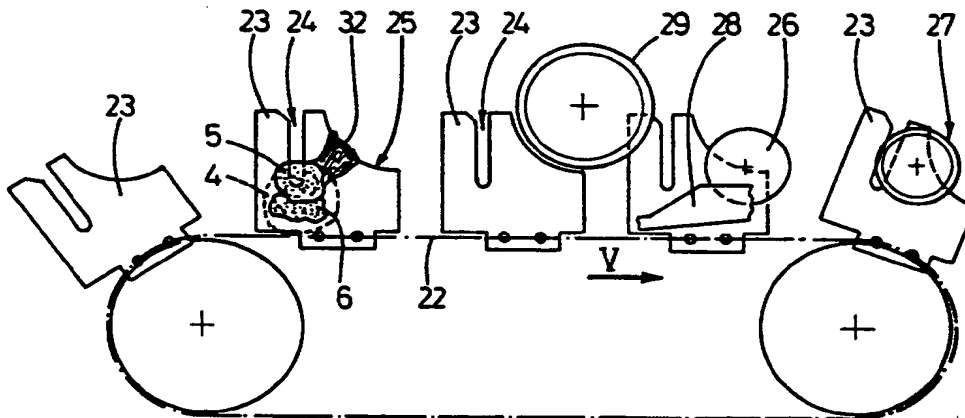


Fig.3

The invention relates to a method for dividing a package removed from a bird, comprising intestines, liver and heart with lungs, in separate parts. Further the invention relates to an apparatus for carrying out said method.

The separate parts of a package comprising intestines, liver and heart with lungs have different destinations, such that it is required to separate them. After such a package has been eviscerated from a bird in a way known per se presently dividing it in separate parts occurs manually.

It is an object of the invention to provide a method of the type referred to above with which the division in separate parts of such a package may be automatised.

Thus the method according to the invention is characterized by moving the package along processing stations for firstly cutting loose the heart-lungs assembly from the package and for next separating the intestines from the liver.

The method according to the invention is less labor intensive than the known method, whereas its processing velocity is considerably higher.

The apparatus for carrying out the method according to the invention is characterized by a conveyor for the package, a cutting means for cutting loose the heart-lungs assembly from the package positioned alongside said conveyor and a separating means cooperating with the conveyor for separating the intestines and the liver. The packages moved along by this conveyor are automatically divided in separate parts by this apparatus. The provision of said packages on the conveyor could occur automatically, but also manually.

Preferably the conveyor comprises a rotating disc which at its circumference is provided with substantially radially extending reception slots for clampingly receiving a package to be processed, such that the heart-lungs assembly and liver are positioned at one side at the disc and the intestines at the other side. During the rotation of the disc a package clamped in one of the reception slots successively passes the cutting means for cutting loose the heart-lungs assembly and the separating means for separating the intestines and liver. After the heart-lungs assembly has been cut loose from the package only the liver and intestines are present at opposite sides of the disc. The heart-lungs assembly, which has been cut loose by the cutting means, is discharged by appropriate means.

After passing the separating means the liver and intestines have been separated and are discharged through appropriate discharge means too.

Preferably the cutting means is a rotating knife, such that cutting loose the heart-lungs assembly may occur without strong forces being applied thereupon. Thus an unwanted damaging of the

package and its parts may be avoided.

Further it is preferred, that a guide extends from the conveyor towards the cutting means, such, that the heart-lungs assembly will pass this cutting means at the one side, whereas the liver will at the other side, between said cutting means and the conveyor. Through such a guide the section of the package comprising liver and heart-lungs assembly is offered to the cutting means in an appropriate way, such that the cut for cutting loose the heart-lungs assembly will be applied between this section and the liver.

In relation therewith it is possible too, that the guiding shortly ahead of the cutting means branches off into two guiding sections passing the cutting means at opposite sides. Thus it can be guaranteed that, while passing the cutting means, both the heart-lungs assembly and liver keep out of reach of the cutting means, such that damaging these parts is impossible.

According to the invention the separating means preferably comprises two stripper discs engaging opposite sides of the conveyor. Through these stripper discs such forces are applied upon the intestines on the one hand and the liver on the other hand, that these are torn loose from each other.

Generally the parts of a package to be processed are surrounded by membranes. One of these membranes extends, among others, between the liver and intestines. Apart from the tissue connecting the liver and intestines this membrane thus defines an additional connection between these two parts of the package. Such a membrane however renders the provision of a package in a reception slot of the conveyor more difficult. For providing a solution therefor the apparatus according to the invention is in a special embodiment characterized in that ahead of the cutting means an additional separating means is provided for loosening a membrane extending, among others, between the liver and the intestines, wherein the conveyor comprises pairs of reception slots, respectively existing of a rearward reception slot for receiving the tissue connecting the liver and intestines and a forward reception slot for receiving said membrane. With the aid of the additional separating means the membrane extending between the liver and intestines is loosened, whereafter the further processing of the package may occur in the above described way.

In this respect it further is preferred that the conveyor comprises a chain conveyor having a number of carriers for the packages each provided with a pair of reception slots.

Hereinafter the invention will be elucidated by means of the drawing, in which two embodiments of the apparatus according to the invention are

illustrated.

Fig. 1 shows, schematically, in a side elevational view part of an embodiment of the apparatus according to the invention;

fig. 2 shows the apparatus of fig. 1 in a top plan view;

fig. 3 shows, schematically, a side elevational view of a second embodiment of the apparatus according to the invention, and

fig. 4 shows the apparatus according to fig. 3 in a top plan view.

As appears clearly from fig. 1 the apparatus according to the invention comprises in the illustrated embodiment a rotating disc 1, which is journaled in a frame or base 2. In a way not shown further the rotating disc 1 is rotated by a motor in correspondence with arrow R.

At its circumference the rotating disc 1 comprises substantially radially extending reception slots 3. The packages which have been removed from a bird and have to be divided in separate parts are clampingly received in these slots. As has been indicated schematically in fig. 2 such a package comprises intestines 4, liver 5 and heart-lungs assembly 6. Previously such a package has been eviscerated from a slaughtered bird in a way not essential here.

Somewhat distanced alongside the rotating disc 1 (as is visible in fig. 2) a cutting means shaped as a rotating knife 7 is provided on a support arm 8 connected with frame 2. In a way not shown further knife 7 is driven by a motor.

At that side of the rotating disc 1, where the knife 7 is positioned, a plate-shaped guiding 9 is provided. As appears especially from fig. 2 said guiding 9 extends in the rotational direction of the rotating disc 1 firstly in parallel with said disc, next inclined away from said disc 1 and finally branches off into two guiding sections 10 and 11 passing the knife 7 at opposite sides.

Further the apparatus according to the invention is provided with a separating means 12 comprising (as appears from fig. 2) two stripper discs 13 and 14 engaging opposite sides of the rotating disc 1. These stripper discs 13 and 14 are mounted on a support arm 15 which is connected to frame 2.

The edges of the stripper discs 13 and 14 are shaped such, that these in cooperation with the radially extending reception slots 3 of the rotating disc 1 act like scissors during the rotation of the disc. The support arms 8 and 15 of the knife 7 and stripper discs 13 and 14, respectively, are both slightly adjustable relative to the disc 1. This has been indicated schematically by lockable knobs 17 engaging slit-shaped openings 16. When the knobs 17 have been released the arms 8 and 15, respectively, can pivot around an axis 18 in a

limited way. The adjustability of the knife 7 and the stripper discs 13 and 14 relative to the rotating disc 1 leads to the possibility of obtaining an optimal operation of the respective parts.

The apparatus operates as follows:

A package comprising intestines 4, liver 5 and heart-lungs assembly 6 is clampingly received in a reception slot 3 of the rotating disc 1 with its tissue connecting the intestines and adjoining liver. This can be carried out manually but also in an automatised way. During the rotation of the disc 1 the upper side of the guiding 9 engages the liver and heart-lungs assembly, especially the tissue connecting these two parts of the package. As a result of the shape of this guiding shown in fig. 2 the liver and heart-lungs assembly will, shortly before reaching the knife 7, reach the position which has been indicated by 5' and 6'. Then the liver 5' is positioned between the rotating disc 1 and the guiding section 10, whereas the heart-lungs assembly is positioned at the opposite side of the knife 7 alongside the guiding section 11.

During the further rotation of the rotating disc 1 the knife 7 cuts loose the heart-lungs assembly from the liver, whereafter this assembly drops in a first container 19.

During a further rotation of the disc 1 the intestines and liver reach the positions indicated with 4'' and 5'', in which they are close to the edge of the stripper discs 13 and 14. Together with the edges of the respective reception slot 3 in the disc 1 the stripper discs 13 and 14 act like scissors on the tissue connecting the intestines 4'' and liver 5'', this tissue being cut through such that the liver 5'' drops in a container 20, whereas the intestines 4'' drop in a container 21 at the opposite side of the disc 1.

Optionally the stripper discs 13 and 14 may be rotating, and may thus comprise an appropriate driving means.

In the alternative embodiment of the apparatus according to fig. 3 and 4 the conveyor comprises a chain conveyor 22 indicated schematically by a striped and dotted line. The direction of motion of the chain conveyor is indicated by arrow V. The chain conveyor supports a number of carriers 23 each being provided with a rearward reception slot 24 and a forward reception slot 25. In the illustrated embodiment the forward reception slot 25 proceeds in the leading edge of the carrier 23.

The reception slot 24 functions in correspondence with the reception slots 3 of the embodiment of the apparatus according to fig. 1 and 2. This means, that the tissue connecting liver 5 and intestines 4 is received in the reception slot 24. The forward reception slot 25 is meant for receiving a membrane 32 (see fig. 4) extending between liver 5 and intestines 4.

In correspondence with the embodiment according to fig. 1 and 2 a cutting means 26 and a separating means 27 comprising two stripper discs are positioned alongside the conveyor. The operation of the cutting means 26 and the separating means 27 is identical to the operation of the cutting means 7 and the separating means 12 according to the previously mentioned embodiment of the apparatus.

Again in correspondence with the previously mentioned embodiment a guiding 28 extends at the cutting means 26.

Compared to the previously mentioned embodiment the embodiment of the apparatus according to fig. 3 and 4 comprises an additional separating means 29 which again may comprise two stripper discs 30 and 31. During the passage of a carrier 23 the stripper discs 30 and 31 take care of loosening the membrane 32, such that only the tissue part received in the reception slot 24 forms a connection between liver 5 and intestines 4 of the package.

For obtaining an optimal operation of the separating means 29 comprising stripper discs 30 and 31 care has been taken, that the edge portion of the carrier 23 defining the reception slot 25 has a radius of curvature corresponding with the radius of the stripper discs 30 and 31. Further the lowermost section of the stripper discs 30 and 31 has a higher elevation than the lowermost end of the reception slot 24, such that during the passage of the carrier 23 alongside the stripper discs 30 and 31 the previously mentioned tissue part is not loosened.

Of course it is possible too that the disc 1 of the embodiment shown in fig. 1 and fig. 2 comprises pairs of reception slots corresponding with the reception slots 24 and 25.

The invention is not limited to the embodiments described before, which can be varied widely within the scope of the invention. Thus it is possible, that apart of the guiding plate 9 or 28 the guiding further comprises a guiding rod extending at a short distance thereabove, such that the tissue connecting the heart-lungs assembly and the liver is enclosed between such a guiding rod and the upper edge of the guiding plate 9.

Claims

1. Method for dividing a package removed from a bird, comprising intestines, liver and heart with lungs, in separate parts **characterized** by moving the package (4, 5, 6) along processing stations for firstly cutting loose the heart-lungs assembly (6) from the package and for next separating the intestines (4) from the liver (5).

2. Apparatus for carrying out the method according to claim 1, **characterized** by a conveyor (1; 22) for the package (4, 5, 6), a cutting means (7; 26) for cutting loose the heart-lungs assembly (6) from the package positioned alongside said conveyor and a separating means (12; 27) cooperating with the conveyor for separating the intestines (4) and the liver (5).

3. Apparatus according to claim 2, **characterized** in that the conveyor comprises a rotating disc (1) which at its circumference is provided with substantially radially extending reception slots (3) for clampingly receiving a package (4, 5, 6) to be processed, such that the heart-lungs assembly (6) and liver (5) are positioned at one side at the disc (1) and the intestines (4) at the other side.

4. Apparatus according to claim 3, **characterized** in that the disc (1) extends in a vertical plane.

5. Apparatus according to one of the claims 2-4, **characterized** in that the cutting means is a rotating knife (7; 26).

6. Apparatus according to one of the claims 2-5, **characterized** in that a guide (9; 28) extends from the conveyor (1; 22) towards the cutting means (7; 26), such, that the heart-lungs assembly (6) will pass this cutting means at the one side, whereas the liver (5) will at the other side, between said cutting means and the conveyor (1; 22).

7. Apparatus according to claim 6, **characterized** in that the guiding (9; 28) comprises at least one appropriately shaped rod section or baffle engaging the tissue interconnecting the heart-lungs assembly (6) and the liver (5).

8. Apparatus according to claim 6 or 7, **characterized** in that the guiding (9; 28) shortly ahead of the cutting means (7; 26) branches off into two guiding sections (10, 11) passing the cutting means at opposite sides.

9. Apparatus according to one of the claims 2-8, **characterized** in that the separating means (12; 27) comprises two stripper discs (13, 14) engaging opposite sides of the conveyor (1; 22).

10. Apparatus according to one of the claims 2-9, **characterized** in that, ahead of the cutting means (7; 26), an additional separating means

(29) is provided for loosening a membrane (32) extending, among others, between the liver (5) and the intestines (4), wherein the conveyor comprises pairs of reception slots, respectively existing of a rearward reception slot (24) for receiving the tissue connecting the liver and intestines and a forward reception slot (25) for receiving said membrane.

11. Apparatus according to claim 10, characterized in that the conveyor comprises a chain conveyor (22) having a number of carriers (23) for the packages each provided with a pair of reception slots (24, 25).

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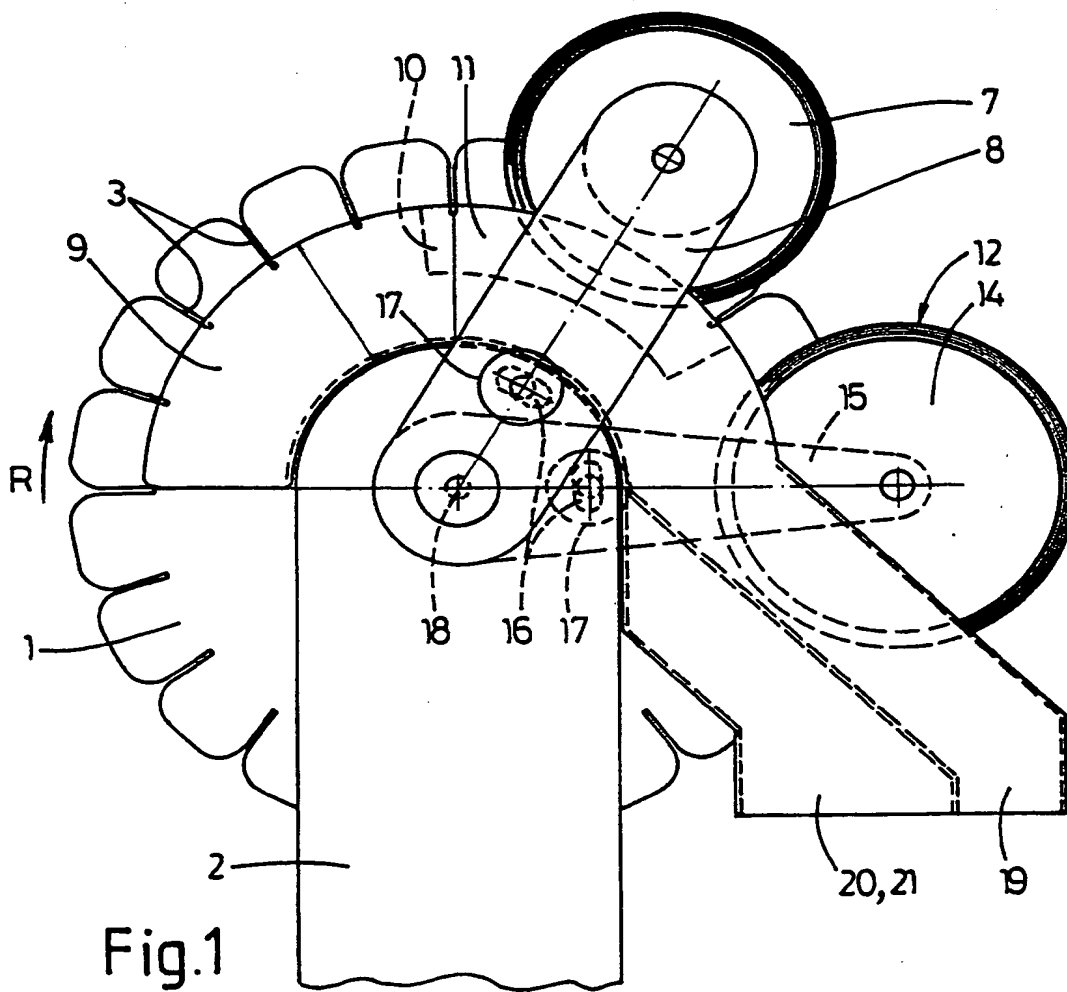
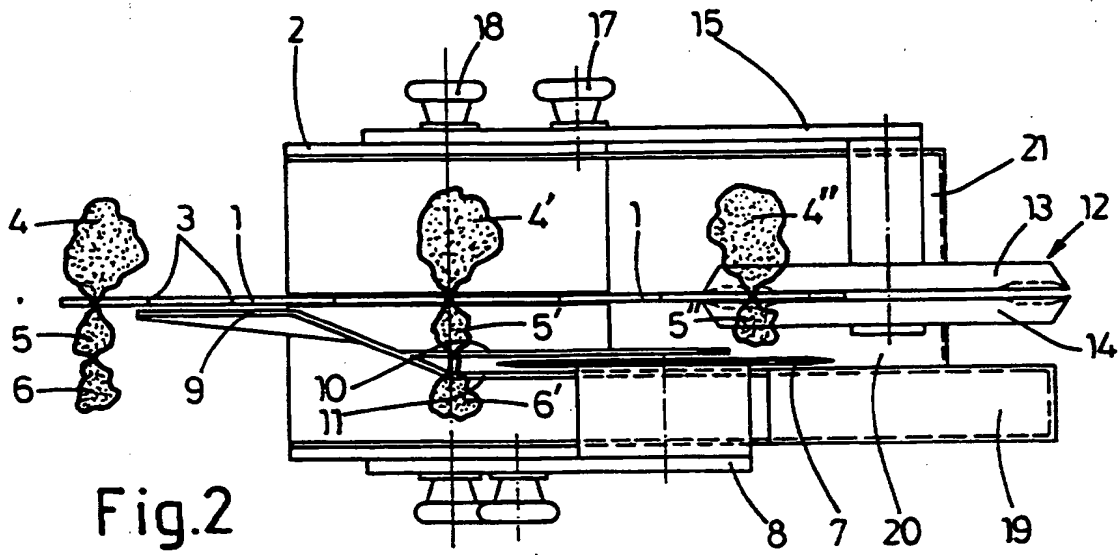
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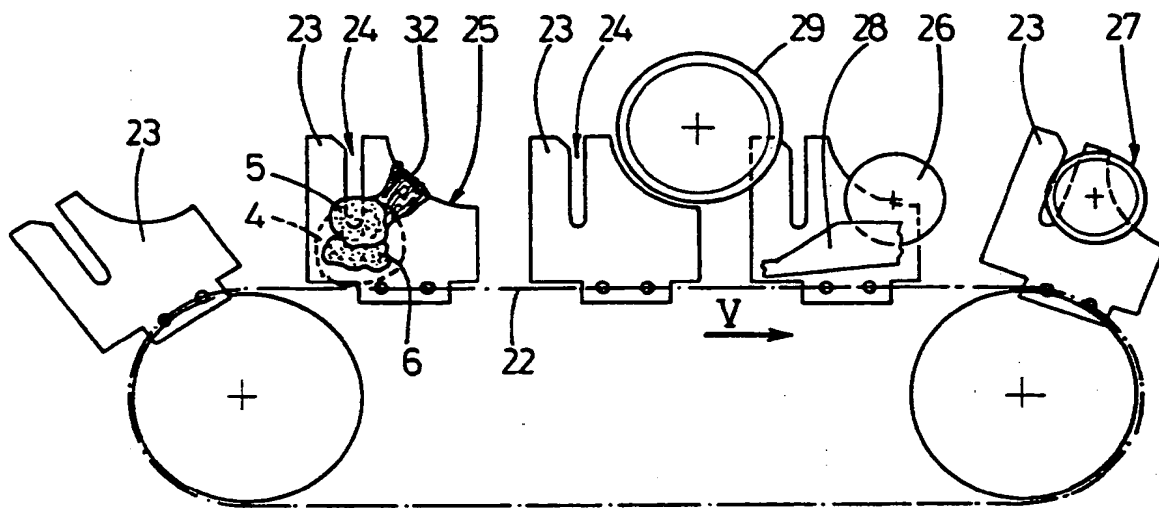


Fig.3

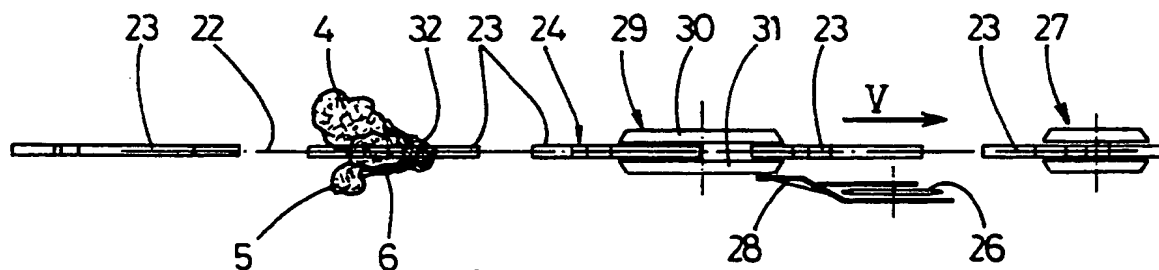


Fig.4



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EUROPEAN SEARCH REPORT

Application Number

EP 92 20 3289

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X A	EP-A-0 439 904 (HARBEN) * the whole document *	1,2,5,6 7	A22C17/14 A22C21/06
P,X	EP-A-0 482 700 (STORK) * column 2, line 29 - column 3, line 15 * * column 4, line 28 - column 5, line 9; claim 1 *	1,2,5,6	
A	GB-A-1 415 153 (STORK)		
A	BE-A-813 138 (VAN BIERVLIET)		
A	GB-A-2 004 175 (ANDERSEN)		
A	US-A-5 041 053 (ELLIS)		
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			A22C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 20 JANUARY 1993	Examiner DE LAMEILLIEURE D.
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